THE FLOODS OF THE BRISBANE RIVER.

(By Inigo Jones.)

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The town of Brisbane has been subject to flooding by its river rising above its banks ever since the establishment of the old convict settlement. In this river, like all others, there are three flood stages: (1) the minor, showing as freshes and slight rises, in the case of the Brisbane, to about 10ft. above low water datum; (2) a moderate flood degree rising from over ten to about twenty feet, and these are marked by the levels of the river flats which have been raised through the deposit of silt in such floods in the past; and (3) the maximum floods, which rise at long intervals high above this mark. Such was the flood of 1893. I shall later present evidence to show that these floods probably come at intervals of about fifty-nine years.

"Flood of History."

There is also, as we know from the history of other rivers, a flood, or perhaps floods, far outstripping these and which may be termed the "Flood of History." Such was a flood in the Nile in the reign of Tiberius, which rose to a height of 24 metres, being some yards above any other on record. The aboriginals have a tradition that once upon a time a flood rose so high that it broke over the banks of the Brisbane River, near the site of the Grey Street Bridge and flowed down through the old reservoir site and down over the site of the present Town Hall, thence flowing into Creek Street, which was an old tributary of the river. This would constitute the flood of history, so far as this city is concerned, and its repetition would be a tragedy too awful to contemplate. The other three classes of floods are, of course, liable to be repeated from time to time: the small ones quite frequently; the second class (up to 20ft. high) at intervals in accordance with the Bruckner cycle; the third at intervals probably of about 59 years with a swing of a few years either way; and the fourth at very long

intervals of some centuries, and a great maximum, when conditions are favourable to it, only once in the course of an aeon.

The damage done by such visitations naturally increases as population and the development of cities on the streams grows. The problem of preventing these inundations or of mitigating their effects then arises. Fortunately the topography of the upper river is such that they may be prevented to so great an extent as to reduce them to mere freshes through a diversion of the upper reaches. It is also possible to show on scientific grounds that the cyclones from which these rains originate, must be attracted to this same upper portion of the river.

The very small circumstances which can change a small flood into an overwhelming one were fully shown in the inundation in the early part of this year (1931), when the railway embankments raised at Mayne caused the highest flood on record in Breakfast Creek. A few days later, in the main river, the people of Yeronga and those parts had the highest flood next to that of 1893. This was caused by the piers of the new bridge, and outworks surrounding them, backing up the water, as was shown by the fact that the rise and fall of the water made a continuous curve above that point, whereas a curve responding to the rise and fall of the tide was noted at the Port Office gauge.

The wonderful topography of the head of the river is what might be termed a heaven-sent means of flood prevention, which it seems to me almost impious to neglect; and there are some very strange facts in connection with that area, and the head of the Obi tributary of the Mary, which should be most carefully investigated in this problem, which means life and death to our city in case of another flood.

First Recorded Flood.

The first flood of which there is a rather uncertain record, seems to have been of considerable height, and to have taken place in the year 1836. In 1841, on January 14, came a flood of the height of that of 1893, in fact exceeding it by 3 inches, and

thus showing by its close identity in height that that flood is not the flood of history, but one that is to be expected at fairly long intervals, the period of which I should suggest to be that of the two Saturnian epochs or about 59 years. In 1844 there were reported heavy floods in Ipswich on January 10, and again on December 17 of the following year. This series has a somewhat similar grouping to the series that surrounded the great flood of 1893; and this makes it seem the more likely that this 59-year grouping is a correct assumption.

The next flood mentioned is that of April 11, 1852. Of none of these, except that of 1841, has the height been left on record. The first measured height is that of May 19, 1857, which reached a height of 13ft. 8ins.; and it is worthy of note that adding the period of 35 years, makes these two last in 1852 and 1857, the precursors, in grouping, of the floods of 1887 and 1892. There is no flood, however, in 1855 to correspond, on the same reasoning, to a flood of 1890; so that possibly that belongs to the longer period and will recur about 1949, or thereabout; and it is a curious fact that in the season of 1924, although there were heavy rains, they never reached the same intensity as they did in 1890.

Then again, there is no flood to match the period of 1893, but the next two minor floods: February 16, 1863, and March 20, 1864, are reproduced in February 14 and 29, 1896, the dreadful "Pearl" disaster in which so many of our friends were drowned, and the flood of January 13, 1898.

The first of these has again been repeated at a similar interval in the floods last year, and it is possible that the latter may recur next year in the normal period of the wet season. The "Courier" of that day recorded afterwards details of the flood of 1857, such as boats plying in the streets and the submersion of Stanley Street, Mantague Road and Hill End. At the time it mentioned that Mr. F. North, at the head station, and the public-house belonging to Mr. J. Smith at Wivenhoe, on the Upper Brisbane, were completely inundated, and people were compelled to take refuge in tents.

In Rockhampton District.

In 1862 there were considerable floods in many parts, and near Rockhampton, Messrs. Archer sailed seven miles from their head station at Gracemere to within a short distance of the town. On June 26 there was a considerable rise in the Bremer, but Brisbane does not record any special effect. In 1863 flooding was very widespread, and from February 18 to 20 a great deal of damage was caused and discomfort occasioned in Ipswich.

The flood at Ipswich was recorded as the highest since that of 1841; and in Warwick the flood reached most disastrous heights.

In 1864 the flood reached a height of 15ft. 4ins. on March 20, after an unusually protracted gale of very great violence. Raff's Wharf was 5ft. under water, and Harris's, Forrest's and Towns' wharves were also covered. At Oxley Creek the water covered a stretch of seven miles. Floods and damage were very general, and the stone jetty at Cleveland was washed completely away during a gale on the 18th. The Condamine was said to be two miles wide in places. Numberless sheep were drowned; traffic was delayed for weeks. In August further rains fell, and Ipswich again suffered.

Again in 1865 there were floods in many parts, and on September 22 a heavy fall of rain caused considerable damage to the dam in course of construction at Enoggera.

In 1866 and 1867.

From December 10 to 12, 1866, there was incessant rain, and the river rose over the A.S.N. Coy.'s wharf, covering the flooring of the shed to the depth of one foot. Five and three-quarter inches of rain fell in Brisbane; and, at Enoggera, the water rose till it flowed over the bywash.

On April 21, 1867, a flood rose over the lower wharves but its height has not been recorded. This flood rose very quickly and brought down great quantities of debris. The barometer sank as low as 29.334.

At Breakfast Creek a house with its inmates was blown off its foundations, leaving the floor in-

tact, and was carried by the wind intact about eight or ten yards. In Ipswich the bridge was threatened by the accumulating debris, and notwithstanding heroic efforts, the whole structure collapsed in two divisions.

In 1868 there were numerous "freshes," but actual flood height was not apparently reached in Brisbane; and again in 1869 heavy floods were reported in other parts of the colony. 1870 was a year of very great floods, and in March, Maryborough had the greatest flood within the memory of man, in which the floating baths were carried out to sea. Clermont was also visited by a most sudden destructive flood, rising to nearly 5ft. over the town, the current flowing at the rate of 8 or 9 miles per hour, and the people having to take refuge in the trees and on the tops of houses. In Brisbane, on March 10, the river reached a height of 12ft. 5ins., and the rainfall for the month was 34.04 inches—a record for that month. All the lower wharves were covered by the water. 1871 was not noted for any special rises at all, while in 1872 floods were very generally reported. Enoggera Reservoir overflowed in February, 1873, and on June 24 the water rose in Brisbane to a height of 11ft. 9ins.

On the Dawson.

In 1875 the Dawson experienced a record flood, 16ft. above that of 1864, though in Brisbane the water only reached to the 11ft. 6ins. level. These two rises were cyclically combined apparently in the 1908 flood on March 15, rising to a height of 14ft. 8ins.

In 1879, on August 30, the floods in Brisbane rose to 11ft., and the Victoria Baths were washed down the river.

An interval of some years then followed, when no floods of note seem to have occurred; and all over the world a climatic effect, said to be due to the explosive eruption of Krakatoa, took place. The wonderful sunsets of that time, with their magenta ray, will long be remembered.

The next flood was the memorable one of January 23, 1887, which was so disastrous on the

Logan, where unprecedented damage was done and enormous distress was occasioned. In Brisbane the water rose to a height of 15ft. 4ins., thus bringing this into the list of major floods—it being equal to that of 1864. It is also memorable as the occasion of the heaviest rainfall in one day ever recorded in Brisbane, the fall being 18.31 inches. Floods occurred in many other parts of the colony in the same year.

A flood occurred in July, 1889, which I well remember, and, on that occasion, several boats were swept from their moorings in the Town Reach. Its height is given as 15ft. 3ins., which has always seemed to me to be greatly in excess of the truth.

In 1890 came a very memorable flood period, the floods being high and spread over a very wide area of the colony. In Brisbane it formed the highest of the major floods, reaching a height of 20ft. 5ins. It may safely be stated that hardly any part of Queensland escaped some degree of visitation. This flood, as I have stated before, seems to me to belong to a cycle of greater than the ordinary Bruckner period, and the same applies to that of 1893.

In 1892 came a destructive gale and a moderate rise of the river in Brisbane, whose height is not recorded. The occasion is noteworthy on account of the destruction of the belfry of St. Mary's, Kangaroo Point, on April 2. The river was at its highest on April 4. In 1893 came the great flood, which will be remembered by many as one of the most disastrous inundations in our history, and one which it should be the policy of our engineers and administrators to prevent recurring. This flood came in two sections of almost equal extent, with a minor flood between, the second flood enabling steamers which had been stranded in the Botanic Gardens to be refloated.

Caused by Cyclones.

The cause of these floods was a series of cyclones concentrating on the Stanley River where, at Crohamhurst, I measured a total rainfall of 77 inches in four days, and of 35.714 in one day, on February 2. Five cyclones in rapid succession contributed to

this flood, and it was the third which contained this deluge. The creeks and rivers from this rapid succession of storms were never allowed to get down to normal, and so the final 16-inch fall produced nearly as great an effect as the first abnormal deluge, coupled with the fact that the fall was rather more general than in the last storm. But it was still the Stanley concentration that caused the flood as, in similar falls at other times, nothing of importance in the way of a flood occurred with the same amount of rain, only the "fresh" stage being reached. Floods were very general in the south-eastern part of the colony; and, in June, the river again rose as the result of a heavy rain from a cyclone on the Stanley to a height of 14ft. 10ins. on the 12th. These were the first occasions on which any gauging of the rain took place on the Stanley above Woodford, but the graphic aspects of the rains, since recorded, seem to show conclusively that it is that river that is the sole cause.

Owing to the facts of the earth's rotation no effects are traceable to the main Brisbane River, notwithstanding its great area of watershed—1830 square miles.

In 1894, although there were big floods in many districts, Brisbane had only some "freshes," which were not thought worthy of having their heights recorded.

In 1895 floods were only recorded in the north of the colony; and, in 1896, floods were very general, and in Brisbane, although the floods in February were nothing in the way of height (only 9ft. 6ins.), yet they are ever memorable from the terrible disaster which overtook the ferry boat "Pearl," which was running, owing to the unsafe condition of the temporary bridge structure. The boat caught against a hawser and was suddenly overturned, throwing her passengers into the muddy turbulent stream. Many well-known families were that day bereaved.

Two Floods in 1898.

In 1898 came two floods—one a major one of 19ft. 5ins., on January 13, and the other a lesser major, of 13ft. 8ins. Both again were due to cyclones concentrating on the Stanley River.

Very general flooding took place in 1908; and Brisbane saw a height of 14ft. 8ins. attained by the waters again. A Stanley cyclone contributed to this effect, and since then the numerous "freshes" have all had this same origin, so that no one any longer looks for any other cause. It is also evident from a careful consideration of recent floods and "freshes" that the cycle of repetition is going steadily on in the manner indicated by the planetary control.

This year has seen another repeated flood; first, on Breakfast Creek, where the rainfall was the second heaviest ever recorded; but the flood, through the obstruction of the waters by the Mayne banking was the actual highest ever witnessed. In the river itself an important flood ensued, which was also subject to important modifications from the same cause. This was the thirteenth flood in levels at the Port Office gauge; but, according to the residents of long standing near my residence, it was next to 1893 and about on a par with those of 1890 and 1898, and according to the flood silt theory and allowance for the clearance of the falls of scrub, it seems very probable that this is so. The extensive damage to the small trees growing along the river at St. Lucia show the tremendous force that the current must have acquired during the rise and fall of the waters.

The rainfalls in Brisbane have been in order of intensity:—

18.31—Jan. 21, 1887.
11.18—Mar. 14, 1908.
10.61—Feb. 5, 1931.
9.63—Mar. 9, 1870.
8.36—Feb. 16, 1893.
7.48—Feb. 24, 1875.
6.60—Dec. 28, 1871.